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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,372	03/09/2001	Kenji Kubomura	KUBOMURA-1	2532

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EXAMINER
PIERCE, JEREMY R

ART UNIT	PAPER NUMBER
1771	9

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-10

Office Action Summary	Application No.	Applicant(s)	
	09/720,372	KUBOMURA ET AL.	
	Examiner	Art Unit	
	Jeremy R. Pierce	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 March 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7 and 21-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7 and 21-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. Amendment C has been filed on March 24, 2003 as Paper No. 9. Claims 1-4 and 7 have been amended. Claims 5, 6, and 8-20 have been cancelled. New claims 21-30 have been added.

Claim Objections

2. Claim 23 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 23 recites "different sheets of reinforcing fibers have different coefficients of linear expansion." But this limitation is already present in claim 4.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 24-26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 24-26 recite the "resin is selected to have a coefficient of linear expansion which at least partly balances the coefficient of linear expansion of said reinforcing fibers." However, the specification does not state how to partly balance the coefficient of linear expansion of the fibers with the resin. No relationship between the resin and fibers is discussed to lead one skilled in the art to know how much resin or what type of resin would be required to "balance" the coefficient of linear expansion of the fibers.

6. Claims 1-4, 7, and 21-30 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims recite a "composite material having a reduced or low coefficient of linear expansion." Applicant argues that it is clear from Applicant's specification that it is "reduced" compared to what is achieved in the prior art. This argument leads one to believe that the prior art, as a whole, has some uniform coefficient of thermal expansion. However, there is no uniform standard among the prior art. The prior art has already set forth reducing the coefficient of linear expansion (see Miyadera et al.). What is the standard that a "reduced" coefficient of linear expansion is compared to? Additionally,

the new limitation "low coefficient of linear expansion" is also indefinite. What is it low compared to?

Claims 24-26 recite the "resin is selected to have a coefficient of linear expansion which at least partly balances the coefficient of linear expansion of said reinforcing fibers." What does "at least partly balance" mean? Does the overall coefficient of linear expansion go to zero? Does it go to zero partially? Does it go to some arbitrary desired value? Does it go to some arbitrary desired value partially?

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 7, 24, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyadera et al. (U.S. Patent No. 4,446,191).

Miyadera et al. teach a heat resistant laminate with a low expansion coefficient (column 1, lines 5-7). The laminate is made from composite fabrics comprising 30-95% by weight of aromatic polyamide and 5-70% by weight of glass fibers (column 1, lines 41-47). The glass fibers have a positive coefficient of thermal expansion, but the aromatic polyamide fibers control the thermal expansion of the composite because they have a negative coefficient of thermal expansion. The composite fabric may be woven (column 1, line 64). The weave may be made from alternating one by one aromatic

polyamide fiber and glass fiber (column 2, lines 4-7). Also, the weave may be formed from twisting fibers of aromatic polyamide and glass together into a yarn, then weaving the yarn (column 2, lines 8-27). The composite fabrics are then impregnated with a resin (column 3, lines 31-36), and optionally made into a prepreg by incorporating hardener with the resin (column 3, lines 42-45).

9. Claims 1, 2, 4, 21, 23, 24, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Kashima et al. (U.S. Patent No. 5,462,791).

Kashima et al. disclose a laminate of fabrics composed of glass fibers and/or polyethylene fibers (column 7, lines 14-64). Each fabric layer may be composed of the same material, alternating the positive coefficient fibers with the negative coefficient fibers, or each fabric may be composed of two different fibers. The fabric layers are then impregnated with an epoxy resin.

10. Claims 1, 2, 4, 21, 23, 24, 26, 28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by Leibowitz (U.S. Patent No. 4,689,110).

Leibowitz discloses a laminate with alternating layers of PTFE material and graphite impregnated with an epoxy resin (column 2, lines 30-48). The high coefficient of expansion of the PTFE is controlled by the graphite layers (column 4, lines 40-65).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 3, 7, 22, 25, 27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leibowitz in view of Yuan (U.S. Patent No. 4,020,209).

Leibowitz does not disclose the fabrics to be woven in a triaxial configuration. Yuan teaches that triaxial fabric can be used to create a range of designs and parameters of strength, density, weight, and porosity (column 2, lines 37-61) and that triaxial fabric is used in preparing circuit boards (column 4, lines 6-7). It would have been obvious to one having ordinary skill in the art to use a triaxial weave in the fabrics of Leibowitz in order to create the fabrics with a wide range of designs and parameters, as taught by Yuan.

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyadera et al. in view of Yuan.

Miyadera et al. do not disclose the fabrics to be woven in a triaxial configuration. Yuan teaches that triaxial fabric can be used to create a range of designs and parameters of strength, density, weight, and porosity (column 2, lines 37-61) and that triaxial fabric is used in preparing circuit boards (column 4, lines 6-7). It would have been obvious to one having ordinary skill in the art to use a triaxial weave in the fabrics of Miyadera et al. in order to create the fabrics with a wide range of designs and parameters, as taught by Yuan.

14. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyadera et al. in view of Leibowitz.

Miyadera et al. do not teach using carbon or polyparaphenylene benzo oxazale fibers as the fibers with a negative coefficient of expansion. Leibowitz teaches that the use of graphite fibers greatly strengthens the circuit board structure (column 5, lines 11-13). It would have been obvious to one having ordinary skill in the art to use graphite fibers as the fibers with a negative coefficient of expansion in the laminate of Miyadera et al. in order to increase the strength of the laminate, as taught by Leibowitz.

Response to Arguments

15. Applicant's arguments filed in Paper No. 9 have been fully considered but they are not persuasive. Other arguments have been considered but are moot in view of the new ground(s) of rejection.

16. Applicant argues that a reduced coefficient of thermal expansion is clear because it is reduced compared to what is achieved in the prior art. But this does not set forth a clear standard as to what is achieved in the prior art. No uniform standard with respect to the art of fiber reinforced composite materials has been established. If "reduced" is to mean that the composite itself has a reduced coefficient of thermal expansion compared to what the coefficient would be absent the fibers that have a negative coefficient, then the claim would be more clear (i.e., the coefficient is reduced because of the addition of the negative coefficient fibers). But comparing it to prior art is oversimplifying, because the prior art is broad with respect to coefficients of thermal expansion in fiber-reinforced laminates.

17. Applicant argues that Miyadera does not make use of any of Applicant's fibers. However, the claims rejected with the Miyadera reference do not recite any specific fiber compositions. Those claims only recite a negative coefficient of expansion, which is present in Miyadera.

18. Applicant argues that Miyadera does not disclose the concept of providing counterbalance by varying the thermal expansion coefficient of different layers and using a triaxial orientation of the fibers. This argument is moot in light of the new grounds of rejection.

19. Applicant argues that Miyadera does not teach balancing coefficients of expansion of the resin as opposed to reinforcing fibers. However, the claims do not recite any manner that the resin is supposed to balance the coefficients of the fibers. What is the point that would be considered "partly balanced"? Miyadera adds resin, which has some coefficient value, so the overall structure would come to some coefficient value. Since no distinct value is claimed, and no teaching is provided in the specification as to what point it is partly balanced, Miyadera anticipates these claims.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: U.S. Patent No. 5,224,017 to Martin and U.S. Patent No. 4,513,055 to Leibowitz.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy R. Pierce whose telephone number is (703)

605-4243. The examiner can normally be reached on Monday-Thursday 7-4:30 and alternate Fridays 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (703) 308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Jeremy R. Pierce
Examiner
Art Unit 1771

May 29, 2003

ELIZABETH M. COLE
PRIMARY EXAMINER